

the composition within limits not deleterious to its property (see col. 25, lines 51-54 of Shiraki). However, Shiraki does not disclose or suggest a clay that has been surface treated with a silane compound (component (c) of the present invention).

Coran discloses a rubber composition in which a component corresponding to component (c) of the present invention is incorporated into the composition for its "improved reinforcing properties." (Column 17, line 54 of Coran. NUCAP is a trade designation of such a clay.)

The Examiner therefore believes that it would be obvious to substitute the silane treated clay of Coran for the untreated clay of Shiraki to improve the reinforcing properties of the Shiraki composition.

It is noted that the Examiner has relied on the language in Coran that NUCAP clays, i.e., clays within the scope of component (c) of claim 1, have "improved reinforcing properties." Other clays not so treated are disclosed in the table at the bottom of column 17 of Coran; namely, "water-washed" clays and "air-floated" clays. The latter two clays do not fall within the scope of component (c) of claim 1.

The question then arises what does the word "improved" mean; improved with respect to the other listed non-treated clays or with respect to the use of no clay at all? In other words, are NUCAP clays included because they provide "improved" reinforcing properties with respect to non so treated clays or are they included because they generally are known to provide improved reinforcing properties?

Looking at Table XI in column 18 of Coran, it can be seen that many rubber compositions were prepared using equal amounts of all of six clays set forth at the bottom of column 17. While samples BB and BC that used a NUCAP clay had better

U.E. (ultimate elongation) properties than samples BE, BF, BI, BJ and BK using a water-washed clay or an air-floated clay, samples BD, BG and BH that used the same water-washed clay and the same air-floated clay had better U.E. properties than samples BB and BC. In other words, the U.E. properties are not dependent on the type of clay used, but just that clay was used.

Since Coran does not teach that one clay is any better than any other, the only conclusion that can be drawn from the statement that NUCAP clays have “improved” reinforcing properties, is with respect to no clay at all. Consequently, it might be prima facie obvious to substitute the silane treated clay of Coran for the non-treated clay of Shiraki to increase the composition’s reinforcement properties, but it would not be expected, based on the teachings of Coran, that the reinforcement properties would necessarily be any better than that that would be obtained with any other clay, particularly a water-washed clay or an air-floated clay. Applicants found, however, that a silane treated clay in combination with a styrene based thermoplastic elastomer modified with an imidazolidinone compound did unexpectedly improve the reinforcing properties of a polyphenylene ester based resin composition compared to the use of a non-treated clay.

In support of Applicants’ position, a Declaration of Mr. Toru Yamaguti was filed on May 5, 2009 which is incorporated herein by reference including the discussion of the Declaration on pages 3 and 4 of the Reply filed that day. The Declaration is hereafter referred to as Declaration I.

For convenience, a copy of the Table in the Appendix attached to Declaration 1 is reproduced below including Example 1 from Table 1 on page 22 of the specification.

	Unit	Ex. 1	Ex. 2	Comp. Ex. 3	Ref. Ex.	Comp. Ex. 4
Polyphenylene ether: a-1	%	71.4	71.4	71.4	71.4	71.4
Thermoplastic elastomer: b-2 b-3	%	5.5	5.5	5.5	5.5	5.5
Inorganic filler: c-1 c-2 c-3	%	22.0	22.0	22.0	22.0	
BHT	%	1.1	1.1	1.1	1.1	1.1
Aromatic phosphoric ester based flame retarder: d-1	Part	11.0	11.0	11.0	11.0	11.0
Drop impact strength	J	44	40	35	21	42
IZOD impact-value	J/m	108	98	59	44	39
Flexural modulus	MPa	3800	3700	3750	3680	2500
Elongation at break	%	100<	80	22	27	19
Gloss	%	88	80	72	62	84

Examples 1 and 2 illustrate the invention using the combination of a polyphenylene ether based resin (component a-1), a styrene based thermoplastic elastomer modified with an imidazolidinone compound (component b-3) and a clay that has been surface treated with a silane compound (component c-2, a mercaptosilane treated clay or component c-3, an aminosilane treated clay). Comparative Example 3 does not use the claimed component b of the invention; the Ref. Example is for comparative purposes and uses an untreated clay and Comparative Example 4 uses no clay.

As argued in the last response and with reference, for example, to the IZOD impact values obtained in Examples 1 and 2 compared with the IZOD impact values obtained in the other three Examples, i.e., 108 and 98 compared to 59, 44, and 39, the combination of the claimed components (a), (b) and (c) produces unexpected superior results. However, the Examiner was not persuaded of the unexpected superiority of a silane-treated clay (claimed component c) when used with a styrene based

thermoplastic elastomer modified with an imidazolidinone compound because all of the Examples used an amount of 22% of clay, when used, which is approximately the midpoint of the claimed range of 5 to 60%.

Accordingly, further experiments were conducted to show that these superior results were also obtained at other silane-treated clay amounts, namely, at 11% and at 49%. Attached is a further Declaration of T. Yamaguti showing the results of these experiments, hereafter Declaration II. Examples 1, A and B, illustrate the claimed invention. Example 1 in the Table of Declaration II is the same as set forth above and in Table 1 on page 22 of the specification. Example A uses the same components a) and b) of the claims, but only 11% of a mercaptosilane treated clay. Example B uses the same components a) and b) of the claims, but 47% of mercaptosilane treated clay. The amounts of components a) and b) in Examples 1, A and B are different from each other to make it possible to melt-knead the composition, but the amounts are within the claimed ranges of components a) and b), namely, (a-1) and (b-3).

Comparative Example 1 is from Table 1 on page 22 of the specification and does not use the claimed component (b-3) of the invention, but rather component (b-1).

Comparative Example A uses the same low amount of silane-treated clay as Example A, namely, 11% of c-2, and does not use the claimed component (b-3) of the invention, but rather component (b-1).

Comparative Example B uses the same higher amount of silane-treated clay as Example B, namely, 49% of c-2 and does not use the claimed component (b-3) of the invention, but rather component (b-1).

These additional experiments show that within the claimed range of 5 to 60% component (c), namely, at 11, 22 and 49% the claimed combination of components b) and c) with a polyphenylene ether based resin (a-1) produces superior IZOD impact values. Note that the results of Example 1 need to be compared with those of Comparative Example 1, Example A with Comparative Example A and Example B with Comparative Example B. In each case the IZOD impact values were significantly better. These results are plotted on the graph of Declaration II, the squares being the IZOD Impact values of Examples A, 1 and B and the circles the values of Comparative Examples A, 1 and B. It should also be noted that the IZOD Impact Values of all of Examples 1, 2, A and B, where from 11-49% of a silane-treated clay was used are higher than the IZOD Impact Value of the Reference Example where untreated clay was used, namely, 108, 98, 196 and 90 compared to 44.

As noted in M.P.E.P. §716.02(a)II, evidence of unobvious or unexpected advantageous properties, "such as superiority in a property the claimed compound shares with the prior art," can rebut a prima facie case of obviousness." Also "evidence that a compound is unexpectedly superior in one of a spectrum of common properties ... can be enough to rebut a prima facie case of obviousness."

Accordingly, in view of the previous and additional evidence presented in Mr. Yamaguti's Declarations, it is submitted that claim 1 is not obvious over Shiraki in view of Coran. Its withdrawal as a ground of rejection of claim 1 and claims 3, 5, and 6 dependent therefrom is therefore requested.

Regarding the properties of Applicants claimed composition, it is submitted that it is not necessary to claim such properties to establish patentability of the claims.

Provided Applicants can show, as they have done above, that the claimed composition produces superior properties compared to the properties that would have been expected from the compositions suggested by the prior art, this is sufficient to establish patentability of the claims.

It is acknowledged above that Shiraki discloses the claimed components a) and b) and that an untreated clay can be used as a filler and that Coran discloses both untreated and silane-treated clays, and, therefore, that it may be prima facie obvious to substitute a silane-treated clay for the untreated clay of Shiraki. However, as discussed above, Coran makes no distinction between the properties of untreated and silane-treated clays. Rather, they are considered to be equivalents. Applicants are not arguing the Examples of Coran to show patentability of the claims, but rather to show that Coran does not teach that one clay is any better than any other.

Consequently, even if it is prima facie obvious to substitute a silane-treated clay for the untreated clay of Shiraki in view of Coran, because Coran teaches the clays are equivalent, then it would be expected that if a silane-treated clay was used it would not provide any better properties than an untreated clay. To the contrary, Applicants have shown with the submitted data that silane-treated clays do, in fact, provide superior results. This could not have been predicted or expected from the combination of the teachings of Shiraki and Coran.

As noted in M.P.E.P. §716.02(a)I, "A greater than expected result is an evidentiary factor pertinent to the legal conclusion of obviousness ... of the claims at issue." While it is noted therein that to overcome a prima facie case of obviousness, Applicants must show that the results were greater than those which would have been